IN THE CLAIMS

The following claim set replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A composite structure comprising a coated element, and at least one fiber optic condition sensor embedded physically within a coating of said coated element, wherein the at least one fiber optic condition sensor exhibits a predetermined strain characteristic which is responsive to a selected condition of the composite structure to be sensed, and wherein said sensor detects a change in the predetermined strain characteristic which is indicative of the condition of said composite structure.

2. (Canceled)

3. (Currently Amended) The structure of claim 1, wherein said coating is a polymeric coating, and wherein said element is an electrical conductor, and wherein the polymeric coating and the at least one fiber optic condition sensor have different coefficients of thermal expansion so as to impart said predetermined strain characteristic.

4. (Currently Amended) The structure of ~~any one of claims 1-3~~ claim 1 or 3, wherein said at least one fiber optic condition sensor comprises a series of axially spaced apart Bragg gratings written therein.

5. (Original) The structure of claim 1, comprising a plurality of said fiber optic condition sensors each embedded in said coating.

6. (Original) The structure of claim 5, wherein each of said fiber optic condition sensors comprises a series of axially spaced apart Bragg gratings written therein.

7. (Currently Amended) The structure of claim 5 or 6, wherein at least one of said fiber optic condition sensors detects ~~a~~ the change in the strain ~~condition~~ characteristic so as to sense a condition of the structure other than a temperature condition ~~of said structure~~, and wherein at least one other fiber optic sensor detects a temperature condition of said structure.

8. (Currently Amended) The structure of claim 1, wherein the coating is a magnetorestrictive coating, and wherein said at least one fiber optic condition sensor detects a change in the strain characteristic in response to the presence of the structure ~~of said coating~~ in a magnetic field.

9. (Currently Amended) A condition detection system comprising:

a composite structure ~~as in claim 1~~ comprised of a coated element, and at least one fiber optic condition sensor embedded physically within a coating of said coated element, wherein the at least one fiber optic condition sensor exhibits a predetermined strain characteristic which is responsive to a selected condition of the composite structure to be sensed, and wherein said sensor detects a change in the predetermined strain characteristic which is indicative of the condition of said composite structure,

a data acquisition system operatively connected to said fiber optic sensor for outputting a signal indicative of ~~a predetermined condition~~ the change in the predetermined strain characteristic of ~~said structure~~ the at least one fiber optic condition sensor, and

a monitor for receiving the signal and providing an indication of said predetermined condition.

10. (Original) The system of claim 9, wherein said monitor provides a visual and/or aural indication of said predetermined condition.

11. (Original) The system of claim 9, wherein said monitor stores data associated with said predetermined condition.

12. (Currently Amended) A wire assembly having integral condition detection capabilities, comprising:

a wire element which includes at least one electrical conductor;

an electrical insulator surrounding said wire element; and

a fiber optic condition sensor in operative association with said electrical insulator to detect a selected condition of said wire assembly, wherein

the fiber optic condition sensor exhibits a predetermined strain characteristic which is responsive to the selected condition of the wire assembly to be detected, and wherein

the fiber optic condition sensor detects a change in the predetermined strain characteristic which is indicative of the selected sensed condition of said wire assembly.

13. (Original) The wire assembly as in claim 12, wherein said fiber optic condition sensor is embedded physically within said electrical insulator.

14. (Original) The wire assembly as in claim 12, wherein said wire element includes a plurality of electrical conductors, and wherein said fiber optic condition

sensor is associated physically with said plurality of electrical conductors so as to be surrounded by said electrical insulator.

15. (Cancelled)

16. (Currently Amended) The wire assembly of claim 12, comprising a plurality of fiber optic condition sensors each in operative association with said electrical insulator and each having a series of axially spaced apart Bragg gratings written therein for detecting the change in the predetermined strain characteristic indicative of the selected sensed condition of the wire assembly ~~on the electrical insulator~~.

17. (Original) The wire assembly of claim 12, wherein the fiber optic condition sensor is oriented substantially parallel to or spirally wound around the electrical conductor.

18. (Currently Amended) The wire assembly of claim 12, wherein the electrical insulator is a polymeric material, wherein the polymeric material and the fiber optic condition sensor have different coefficients of thermal expansion so as to impart said predetermined strain characteristic.

19. (Original) The wire assembly of claim 18, wherein the polymeric material is extruded as a coating onto the electrical conductor.

20. (Original) The wire assembly of claim 18, wherein the polymeric material is a heat-shrunk tube, tape wrap or woven sleeve.

21. (Original) The wire assembly of claim 18, wherein the polymeric material is a polyolefin, polytetrafluoroethylene, fluorinated ethylene propylene, polyvinylidene fluoride, ethylene-tetrafluoroethylene, or polyimide.

22. (Original) The wire assembly of claim 21, wherein the polymeric material is a heat shrunk tube, tape wrap or woven sleeve.

23. (Currently Amended) An insulation wear detector system comprising: ~~a wire as in claim 11,~~

a wire assembly comprising a wire element which includes at least one electrical conductor; an electrical insulator surrounding said wire element; and a fiber optic condition sensor in operative association with said electrical insulator, wherein the fiber optic condition sensor exhibits a predetermined strain characteristic which is responsive to a wear condition of the electrical insulator, and wherein the fiber optic condition sensor detects a change in the predetermined strain characteristic which is indicative of the wear condition of said electrical insulator;

a data acquisition system operatively connected to said fiber optic sensor for outputting a signal indicative of a ~~predetermined~~ change in the predetermined strain characteristic of the ~~electrical insulator~~ fiber optic sensor, and

a monitor for receiving the signal and providing an indication of the wear condition of the electrical insulator ~~said predetermined change in strain~~.

24. (Original) The system of claim 23, wherein said monitor provides a visual and/or aural indication of said predetermined change in strain.

25 – 43. (cancelled)

44. (New) The system of claim 23, further comprising at least one other said fiber optic condition sensor for detecting a temperature condition of the wire assembly and for outputting a temperature signal indicative of the temperature condition of the wire assembly.

45. (New) The system of claim 44, wherein the data acquisition system receives the temperature signal and compares the temperature signal to the signal indicative of the wear condition of the electrical insulator.

46. (New) A magnetic field strength sensor assembly comprising a magnetorestrictive material, and at least one fiber optic condition sensor associated physically with the magnetorestrictive material, wherein the magnetorestrictive material induces a strain characteristic on the at least one fiber optic condition sensor in response to exposure to a magnetic field, and wherein the sensor detects the strain characteristic which is indicative of magnetic field strength.

47. (New) A system for detecting magnetic field strength comprising a sensor assembly as in claim 46, a data acquisition system operatively connected to said fiber optic sensor for outputting a signal indicative of the detected strain characteristic induced by the magnetic field, and a monitor for receiving the signal and providing an indication of magnetic field strength.